
Structural influence of late orogenic cycles within metamorphic basement: First evidence of Triassic vertical strain partitioning in the South China Block and geodynamic implications

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Résumé

Deciphering the tectonic evolution of polycyclic orogenic basements is not always straightforward and remains a significant issue for many orogenic belts. It is especially the case in ancient mountain belts that were affected by later polyphasic orogenic deformation, widespread magmatism, and/or strong metamorphic overprint, and where a long-lived erosion reworked most of the stratigraphic markers, like in South China.

Based on field mapping and detailed kinematic analyses in the Yunkai massif (southwestern South China), anatexis-induced three-dimensional strain partitioning and gneiss dome formation have been documented. Petrographic and microstructural analyses suggest that the cores of the gneiss domes and plutons recorded magmatic to sub-solidus lateral flow while strain localization at the top of gneiss domes is characterized by retrogressive shearing. Zircon U-Pb dating of diatexites and late-kinematic plutons give coherent crystallization ages of ca. 240 Ma, suggesting that the regional partial melting and gneiss doming occurred in the Triassic and probably as early as Late Permian, rather than during the Early Paleozoic as previously thought. The transition from deep high-grade rocks to upper crustal low-grade metamorphic rocks corresponds to multi-kilometer thick high-strain domains that evolve laterally from strike-slip to reverse shear zones.

By integrating these results with available tectono-metamorphic data at a large scale, it is possible to decipher the relative influence of the surrounding subducting slabs on the South China Block. In addition, it rises significant implications concerning the rheological behavior of this craton and how shortening was accommodated within the crust at that time. Indeed, three-dimensional strain partitioning illustrates a hot-orogen deformation mode, suggesting that the South China Block may have experienced the development of an orogenic plateau at Late Permian-Middle Triassic times.

Mots-Clés: Hot orogen, Lateral crustal flow, Paleo, Pacific subduction, orogenic plateau

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